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EXAMINER

LEWIS, MONICA

ART UNIT PAPER NUMBER

2822

DATE MAILED: 07/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AA

Office Action Summary

Application No.

10/010,237

Applicant(s)

SEN, BIDYUT K.

Examiner

Monica Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. This action is in response to the amendment filed May 19, 2003.

Response to Arguments

2. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 5, 7, 8, 11-13 and 18 are rejected under 35 U.S.C. 103(a) as obvious over Mamodaly et al. (U.S. Patent No. 4,839,712) in view of Applicant's Prior Art Figures.

In regards to claim 1, Mamodaly et al. ("Mamodaly") discloses the following:

a) an unitary capacitor having a bottom surface and a top surface, and an aperture is formed in a central portion thereof extending from the top surface to the bottom surface (For Example: See Figure 4, Figure 5 and Figure 6).

In regards to claim 1, Mamodaly fails to disclose the following:

a) the bottom surface is provided with electrical connections adapted to be connected to a substrate.

However, Applicant's Prior Art discloses a bottom surface that is provided with electrical connections (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include a bottom surface that is provided with electrical connections as disclosed in

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Applicant's Prior Art because it aids in connecting the device with the substrate (For Example: See Paragraph 2).

Additionally, since Mamodaly and Applicant's Prior Art Figures are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art Figures would have been recognized in the pertinent art of Mamodaly.

In regards to claim 2, Mamodaly discloses the following:

a) aperture is rectangular.

Although Mamodaly does not specifically disclose a rectangular aperture, an aperture is formed. It is design choice to have an aperture that is rectangular.

In regards to claim 3, Mamodaly discloses the following:

a) a unitary capacitor that comprises a layer of an electrically conductive material and a layer of a dielectric material (For Example: See Figure 6).

In regards to claim 5, Mamodaly discloses the following:

a) electrical connections provided on the bottom surface comprise a ball grid array.

However, Applicant's Prior Art discloses a bottom surface that is provided with electrical connections (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include a bottom surface that is provided with electrical connections as disclosed in Applicant's Prior Art because it aids in connecting the device with the substrate (For Example: See Paragraph 2).

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Additionally, since Mamodaly and Applicant's Prior Art Figures are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art Figures would have been recognized in the pertinent art of Mamodaly.

In regards to claim 7, Mamodaly discloses the following:

a) the aperture is configured to fit over a semiconductor die (For Example: See Figure 2).

In regards to claim 7, Mamodaly discloses the following:

a) electrical connections are configured for connection to a package substrate on which the semiconductor die is mounted.

However, Applicant's Prior Art discloses a bottom surface that is provided with electrical connections (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include a bottom surface that is provided with electrical connections as disclosed in Applicant's Prior Art because it aids in connecting the device with the substrate (For Example: See Paragraph 2).

Additionally, since Mamodaly and Applicant's Prior Art Figures are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art Figures would have been recognized in the pertinent art of Mamodaly.

In regards to claim 8, Mamodaly discloses the following:

a) a semiconductor die (1 and 9) mounted on a top portion of a top surface of a package substrate (For Example: See Figure 6); and

b) a unitary capacitor having an aperture formed therein, and mounted on the top surface of the package substrate surrounding the semiconductor die (For Example: See Figure 4 and Figure 5).

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In regards to claim 8, Mamodaly fails to disclose the following:

- a) a window frame.

Although Mamodaly does not specifically disclose a “windowframe” capacitor, a capacitor is disclosed that is illustrated in a framed manner surrounding the die.

In regards to claim 11, Mamodaly fails to disclose the following:

- a) the aperture is rectangular.

Although Mamodaly does not specifically disclose a rectangular aperture, an aperture is formed. It is design choice to have an aperture that is rectangular.

In regards to claim 12, Mamodaly discloses the following:

- a) the capacitor comprises a housing (For Example: See Figure 6).

In regards to claim 13, Mamodaly discloses the following:

a) capacitor comprises a capacitive material disposed within said housing (For Example: See Figure 6).

In regards to claim 18, Mamodaly discloses the following:

a) the available surface area is substantially equal to an area of the top surface of the package substrate less an area of the semiconductor die (For Example: See Figure 4 and Figure 5).

5. Claim 4 is rejected under 35 U.S.C. 103(a) as obvious over Mamodaly et al. (U.S. Patent No. 4,839,712) in view of Applicant's Prior Art Figures and Barnett et al. (U.S. Publication No. 2002/0011354).

In regards to claim 4, Mamodaly fails to disclose the following:

- a) the housing of the unitary capacitor is made from a plastic material.

However, Barnett et al. (“Barnett”) discloses housing made from plastic (For Example: See Paragraph 0010). It would have been obvious to one having ordinary skill in the art at the

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time the invention was made to modify the semiconductor device of Mamodaly to include housing made from plastic as disclosed in Barnett because it aids in protecting the device from being damaged (For Example: See Figures 4-7).

Additionally, since Mamodaly and Barnett are both from the same field of endeavor, the purpose disclosed by Barnett would have been recognized in the pertinent art of Mamodaly.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as obvious over Mamodaly et al. (U.S. Patent No. 4,839,712) in view of Applicant's Prior Art Figures and Pape (U.S. Patent No. 6,215,171).

In regards to claim 6, Mamodaly fails to disclose the following:

a) the unitary capacitor capacitive material comprises co-fired ceramic.

However, Pape discloses capacitive material made from co-fired ceramic (For Example: See Column 8 Lines 10-12). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include capacitive material made from co-fired ceramic as disclosed in Pape because it aids in determining the capacitance of capacitors (For Example: See Column 3 Lines 39-47 and Column 4 Lines 10-26 and Column 4 Lines 64-67).

Additionally, since Mamodaly and Pape are both from the same field of endeavor, the purpose disclosed by Pape would have been recognized in the pertinent art of Mamodaly.

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7. Claims 9 and 17 are rejected under 35 U.S.C. 103(a) as obvious over Mamodaly et al. (U.S. Patent No. 4,839,712) in view of Applicant's Prior Art Figures and Komiya et al. (U.S. Publication No. 2002/0011662).

In regards to claim 9, Mamodaly fails to disclose the following:

a) electronic component mounted on a top surface of the capacitor.

However, Komiya discloses the use of an electronic component mounted on a top surface of a capacitor (For Example: See Figure 5). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include the use of an electronic component mounted on a top surface of a capacitor as disclosed in Komiya because it aids in reducing the inductance (For Example: See Paragraph 5).

Additionally, since Mamodaly and Komiya are both from the same field of endeavor, the purpose disclosed by Komiya would have been recognized in the pertinent art of Mamodaly.

In regards to claim 17, Mamodaly fails to disclose the following:

a) the capacitor is mounted on the package substrate via a ball grid array.

However, Komiya discloses the use of a ball grid array (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include a ball grid array as disclosed in Komiya because it aids in providing low impedance connections (For Example: See Paragraph 24).

Additionally, since Mamodaly and Komiya are both from the same field of endeavor, the purpose disclosed by Komiya would have been recognized in the pertinent art of Mamodaly.

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8. Claim 10 is rejected under 35 U.S.C. 103(a) as obvious over Mamodaly et al. (U.S. Patent No. 4,839,712) in view of Applicant's Prior Art Figures, and Tigelaar et al. (U.S. Patent No. 4,827,323).

In regards to claim 10, Mamodaly fails to disclose the following:

a) a second capacitor mounted on the first capacitor.

However, Tigelaar et al. ("Tigelaar") discloses capacitors stacked on each other (For Example: See Column 1 Lines 31-57). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include capacitors stacked on each other as disclosed in Tigelaar because they aid in increasing capacitance (For Example: See Column 1 Lines 31-57).

Additionally, since Mamodaly and Tigelaar are both from the same field of endeavor, the purpose disclosed by Tigelaar would have been recognized in the pertinent art of Mamodaly.

9. Claim 14 is rejected under 35 U.S.C. 103(a) as obvious over Mamodaly et al. (U.S. Patent No. 4,839,712) in view of Applicant's Prior Art Figures and Miller et al. (U.S. Patent No. 6,072,211).

In regards to claim 14, Mamodaly fails to disclose the following:

a) the capacitive material comprises a layer of an electrically conductive material and a layer of a dielectric material.

However, Miller discloses capacitive material (See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include capacitive material as disclosed in Miller because it aids in shunting the inductance (See Abstract and Column 2 Lines 11-41).

Additionally, since Mamodaly and Miller are both from the same field of endeavor, the purpose disclosed by Miller would have been recognized in the pertinent art of Mamodaly.

10. Claim 15 is rejected under 35 U.S.C. 103(a) as obvious over Mamodaly et al. (U.S. Patent No. 4,839,712) in view of Applicant's Prior Art Figures, Miller et al. (U.S. Patent No. 6,072,211) and Barnett et al. (U.S. Publication No. 2002/0011354).

In regards to claim 15, Mamodaly fails to disclose the following:

a) the housing is made from a plastic material.

However, Barnett discloses housing made from plastic (For Example: See Paragraph 0010). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include housing made from plastic as disclosed in Barnett because it aids in protecting the device from being damaged (For Example: See Figures 4-7).

Additionally, since Mamodaly and Barnett are both from the same field of endeavor, the purpose disclosed by Barnett would have been recognized in the pertinent art of Mamodaly.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as obvious over Mamodaly et al. (U.S. Patent No. 4,839,712) in view of Applicant's Prior Art Figures, Barnett et al. (U.S. Publication No. 2002/0011354) and Pape (U.S. Patent No. 6,215,171).

In regards to claim 16, Mamodaly fails to disclose the following:

a) the housing comprised co-fired ceramic.

However, Barnett discloses housing made from co-fired ceramic (For Example: See Paragraph 0024). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include capacitive

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and housing material made from co-fired ceramic as disclosed in Barnett because it aids in providing high density and low cost devices (For Example: See Paragraphs 1-3).

Additionally, since Mamodaly and Barnett are both from the same field of endeavor, the purpose disclosed by Barnett would have been recognized in the pertinent art of Mamodaly.

b) the capacitive material comprised of co-fired ceramic.

However, Pape discloses capacitive material made from co-fired ceramic (For Example: See Column 8 Lines 10-12). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Mamodaly to include capacitive material made from co-fired ceramic as disclosed in Pape because it aids in determining the capacitances of capacitors (For Example: See Column 3 Lines 39-47 and Column 4 Lines 10-26 and Column 4 Lines 64-67).

Additionally, since Mamodaly and Pape are both from the same field of endeavor, the purpose disclosed by Barnett would have been recognized in the pertinent art of Mamodaly.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 703-305-3743.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML

July 18, 2003


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
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